

RECEIVED

JAN 04 2001

Technology Center 2100

The Commissioner of
Patents and Trademarks

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

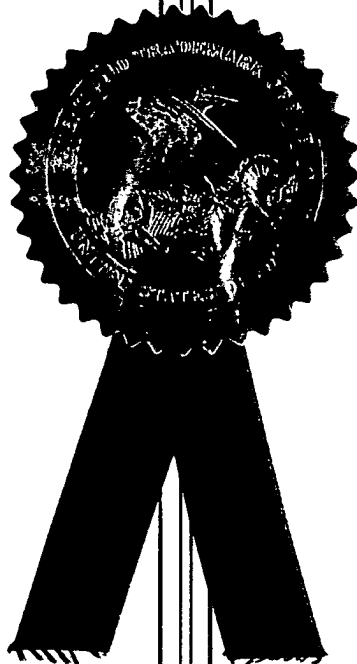
United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term set forth below, subject to the payment of maintenance fees as provided by law.

If this application was filed prior to June 8, 1995, the term of this patent is the longer of seventeen years from the date of grant of this patent or twenty years from the earliest effective U.S. filing date of the application, subject to any statutory extension.

If this application was filed on or after June 8, 1995, the term of this patent is twenty years from the U.S. filing date, subject to any statutory extension. If the application contains a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121 or 365(c), the term of the patent is twenty years from the date on which the earliest application was filed, subject to any statutory extension.

The
United
States
of
America



Bence Lehman

Commissioner of Patents and Trademarks

Allie M. Person
Attest



US005793779A

United States Patent [19]

Yonemitsu et al.

[11] **Patent Number:** 5,793,779[45] **Date of Patent:** Aug. 11, 1998

[54] **OPTICAL DISK AND METHOD AND APPARATUS FOR RECORDING AND THEN PLAYING INFORMATION BACK FROM THAT DISK**

[75] **Inventors:** Jun Yonemitsu, Kanagawa; Shunji Yoshimura, Tokyo; Makoto Kawamura, Kanagawa, all of Japan

[73] **Assignee:** Sony Corporation, Tokyo, Japan

[21] **Appl. No.:** 457,844

[22] **Filed:** Jun. 1, 1995

Related U.S. Application Data

[62] **Division of Ser. No.** 405,852, Mar. 17, 1995.

[30] Foreign Application Priority Data

Mar. 19, 1994 [JP] Japan 6-07444

[51] **Int. Cl.⁶** G11B 20/18

[52] **U.S. Cl.** 371/402; 371/374

[58] **Field of Search** 371/37.1, 37.5,
371/37.4, 40.1

[56] References Cited**U.S. PATENT DOCUMENTS**

Re. 31,666	9/1984	Doi et al.	371/43
4,348,659	9/1982	Fujimori et al.	340/347 AD
4,413,340	11/1983	Odaka et al.	371/38.1
4,476,562	10/1984	Sako et al.	371/37.5
4,499,454	2/1985	Shimada	340/347 DD
4,833,471	5/1989	Tokuume et al.	341/67
5,065,388	11/1991	Roth et al.	369/47
5,198,813	3/1993	Isozaki	341/59
5,239,531	8/1993	Abe	369/109
5,243,588	9/1993	Maeda et al.	369/54
5,276,674	1/1994	Tanaka	369/275.3
5,282,192	1/1994	Yamada et al.	369/279.3
5,315,400	5/1994	Kurata et al.	358/355
5,325,352	6/1994	Matsumoto	369/275.1
5,351,132	9/1994	Sawabe et al.	358/342
5,353,277	10/1994	Yasuda et al.	369/275.4
5,357,494	10/1994	Aratani	369/13
5,371,602	12/1994	Tsuboi et al.	358/335
5,377,178	12/1994	Saito et al.	369/124

5,388,093	2/1995	Yoshida et al.	369/124
5,426,624	6/1995	Goto	369/32
5,428,598	6/1995	Veldhuis et al.	369/275.3
5,434,829	7/1995	Maeda et al.	369/48
5,446,714	8/1995	Yoshio et al.	369/48
5,455,684	10/1995	Funjinami et al.	358/335
5,463,565	10/1995	Cookson et al.	364/514 R
5,471,606	11/1995	Huang et al.	395/500
5,477,525	12/1995	Okabe	369/275.3
5,493,558	2/1996	Kihara	369/275.2
5,506,823	4/1996	Sanada	369/48

OTHER PUBLICATIONS

French, "Alternative Modulation Codes for the Compact Disc", IEEE Transactions on Consumer Electronics, vol. 34, No. 4, Nov. 1988, pp. 908-913 Nov. 1988.

Saito et al., "Demonstration of High Data Density Recording on Direct Overwrite Magneto-Optical Disk", IEEE Transactions on Magnetics, vol. 28, No. 5, Sep. 1992, pp. 2512-2514 Dec. 1992.

Yoshimura, S., et al., "Large-Capacity Magneto-Optical Disk System Using Magnetically Induced Super Resolution", IEEE Transactions on Consumer Electronics, vol. 38, No. 3, pp. 660-665 Aug. 1992.

J. van der Meer, "The Full Motion System for CD-I", IEEE Transactions on Consumer Electronics, vol. 38, No. 4, pp. 910-922 Nov. 1992.

Primary Examiner—Stephen M. Baker

Attorney, Agent, or Firm—William S. Frommer; Alvin Sinderbrand

[57]

ABSTRACT

An optical disk having a diameter less than 140 mm and, a thickness of 1.2 mm±0.1 mm, with a plurality of record tracks having data recorded thereon as embossed pits representing information and exhibiting a track pitch in the range between 0.646 μm and 1.05 μm; with the tracks being divided into a lead-in area, a program area and a lead-out area. The data includes table of contents (TOC) information recorded in a plurality of sectors in at least one TOC track and user information recorded in a plurality of sectors in user tracks; with the TOC information including addresses of start sectors recorded in the user tracks. The data (both user and TOC information) is encoded in a long distance error correction code having at least eight parity symbols, and is run length limited (RLI) modulated.

64 Claims, 29 Drawing Sheets